

REMARKS

In the Office Action mailed March 25, 2008 (hereinafter "Office Action"), Claims 1-7, 10-12, 16-22, 25-27, 31-34, 37-43, 46-58, and 60-68 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement and the enablement requirement. Claims 1-3, 7, 10-12, 16-18, 22, 25-27, 31-33, 37-42, 46-48, 53-54, and 57 were rejected under 35 U.S.C. § 103(a) as unpatentable over "Load Balancing a Cluster of Web Servers Using Distributed Packet Rewriting," by Aversa et al., January 1999 (hereinafter "Aversa"), in view of "TCP Connection Migration," by Snoeren et al. (hereinafter "Snoeren"). Claims 4-6, 19-21, 34, 43, 61, and 64 were rejected under 35 U.S.C. § 103(a) as unpatentable over Aversa in view of U.S. Patent No. 6,334,153, issued to Boucher et al. (hereinafter "Boucher"). Claims 36, 45, 49-52, 55, 56, 58, 66, and 68 were rejected under 35 U.S.C. § 103(a) as unpatentable over Aversa in view of Boucher, and further in view of Snoeren. Claims 60, 62, 63, 65, and 67 were rejected under 35 U.S.C. § 103(a) as unpatentable over Aversa in view of Snoeren, and further in view of Boucher.

With this response, applicant has amended Claims 1-4, 7, 10, 16-19, 25, 31, 47-49, 53, 58 and 63. Claims 37 and 46 are canceled. Claim 69 is new. No new matter has been added by these amendments. Accordingly, Claims 1-7, 10-12, 16-22, 25-27, 31-34, 38-43, 47-58, and 60-69 are currently pending in this application. Applicant has carefully considered the issues raised in the Office Action and requests reconsideration and allowance of the claims in view of the remarks set forth below.

Patentability Under 35 U.S.C. § 112, First Paragraph

The Office Action rejected the pending claims under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement and the enablement requirement. Specifically, the Office Action rejected the claims due to the addition of the feature "in a manner transparent to the client," asserting that this subject matter was not described in the specification and was not enabled by the specification. Applicant respectfully disagrees with the basis of these

rejections, but has included herewith amendments that remove the objectionable language from the independent claims to further advance prosecution of this application.

Accordingly, applicant respectfully submits that the 35 U.S.C. § 112, first paragraph, rejections are now moot, and requests withdrawal of the rejections and allowance of the claims.

Patentability Under 35 U.S.C. § 103(a)

Independent Claims 1, 16, and 58

The Office Action rejected independent Claims 1 and 16 under 35 U.S.C. § 103(a) as unpatentable over Aversa in view of Snoeren. The Office Action also rejected independent Claim 58 under Section 103(a) as unpatentable over Aversa in view of Boucher and Snoeren. Applicant respectfully disagrees, but has amended these independent claims to further advance prosecution of the present application.

As amended, Claim 1 recites:

1. An information processing system, comprising:
a first computing device configured to:
store an unbound data structure associated with a connection to a client in response to receiving an initialization packet from the client;
select a computing device to service the client;
when the first computing device is selected to service the client, bind the unbound data structure to an application of the first computing device; and
when a second computing device distinct from the first computing device is selected to service the client, *migrate the unbound data structure to the second computing device by outputting an encapsulated packet including the unbound data structure to the second computing device to enable the second computing device to output packets to the client configured to appear to the client to have been sent from the first computing device.* (Emphasis added.)

As amended, Claim 16 recites:

16. A method performed by a first server, the method comprising:
storing an unbound data structure associated with a connection to a client originating an initialization packet;
selecting a server to service the client;

when the first server is selected to service the client, binding the data structure to an application of the first server; and

when a second server distinct from the first server is selected to service the client, *migrating the unbound data structure to the second server by outputting an encapsulated packet including the unbound data structure to the second server to enable the second server to output packets to the client configured to appear to the client to have been sent from the first server.* (Emphasis added.)

As amended, Claim 58 recites:

58. A first server, comprising:

a memory configured to store an unbound data structure associated with a connection to a client originating an initialization packet;

a network protocol stack external to an operating system of the first server; and

a module configured to selectively bind the data structure associated with the connection to the client to an application of the first server, and, when the first server is not selected to service the client, to *migrate the data structure to a second server by outputting an encapsulated packet including the unbound data structure to the second server to enable the second server to output packets to the client configured to appear to the client to have been sent from the first server.* (Emphasis added.)

Applicant respectfully submits that Aversa, Snoeren, and Boucher, both alone and in combination, fail to teach or suggest a first computing device configured to, when a second computing device is selected to service the client, *migrate* an unbound data structure to the second computing device by outputting an encapsulated packet to the second computing device to enable the second computing device to output packets to the client *configured to appear to the client to have been sent from the first computing device*, the encapsulated packet *including the unbound data structure*, as recited in amended Claims 1, 16, and 58.

The Office Action admits that Aversa does not expressly disclose that when the first computing device is not selected to service the client, migrating the unbound data structure associated with the connection to the selected computing device in a manner transparent to the client, as recited in Claim 1 before amendment. (Office Action, p. 8.) Applicant agrees, and respectfully submits that Aversa similarly fails to expressly disclose the above-described features

of amended Claim 1, including the *migration of an unbound data structure by outputting an encapsulated packet* to a second computing device to enable the second computing device to output packets to the client configured to *appear to have been sent from the first computing device*.

Applicant respectfully submits that Snoeren and Boucher both fail to make up for this deficiency in Aversa. Boucher is cited by the Office Action for its alleged use of a network protocol stack external to an operating system of the first server, Office Action (p. 28), but applicant submits that neither this portion nor any other portion of Boucher discloses the above-described features of Claims 1, 16, and 58. Applicant further submits that Snoeren also fails to disclose or suggest these features, and instead requires the client to collaborate in the connection migration process, and would result in the client being sent packets from the second computing device that appear to be sent from the second computing device instead of the first computing device.

As described in the previous response, Snoeren describes a technique for migrating an active TCP connection for inter-host migration of connections. (Snoeren, Abstract; p. 1.) This technique involves a negotiation between two hosts during the initial connection that allows the connection to be migrated. See Snoeren, p. 5 ("In order for a connection to be [sic] migrateable, the correspondent hosts must first exchange Migrate-Permitted Options during the SYN handshake.") To thereafter migrate the connection, one of the hosts creates a second connection, the application is associated with the new connection, and the first connection is dropped. (See Snoeren, pp. 5-6; 9-10.) Once established, packets sent over the second connection of Snoeren would appear to the client to come over the second connection, and no longer be associated with the first connection. Applicant respectfully submits that this fails to disclose a first computing device configured to migrate an unbound data structure to a second computing device to enable the second computing device to output packets to the client configured to appear to the client to have been sent *from the first computing device*.

Accordingly, applicant respectfully submits that Claims 1, 16, and 58 are patentable, and requests withdrawal of the 35 U.S.C. § 103(a) rejections and allowance of the claims.

Dependent Claims 2, 3, 7, 17, 18, 22, 31-33, 40-42, 60, 63, and 69

Claims 2, 3, 7, 31-33, 60, and 69 depend from Claim 1. Claims 17, 18, 22, 40-42, and 63 depend from Claim 16. Applicant respectfully submits that these claims are allowable at least by virtue of these dependencies, as well as by virtue of the additional claim features set forth therein.

For example, the Office Action asserts that multiple features from Claims 2, 7, 17, 22, 31, and 40 are inherently disclosed by the "Transmission Control Protocol" specification (hereinafter "TCP Specification") and the allegedly admitted prior art (hereinafter "AAPA"). Applicant respectfully traverses these assertions, and submits that neither the TCP Specification, the AAPA, nor any of the other cited patents and publications explicitly or inherently disclose an *unbound* data structure of any type, much less an *unbound* data structure that includes a group of sequence numbers (Claims 2 and 17), or an *unbound* data structure comprising a connection endpoint (Claims 31 and 40).

As a further example, applicant also respectfully submits that neither the TCP Specification, the AAPA, nor any of the other cited patents and publications expressly or inherently discloses a first computing device configured to generate an acknowledgement to the client *before migrating an unbound data structure* (Claims 7 and 22).

As yet another example, applicant respectfully submits that none of the cited patents or publications teach or suggest an encapsulated packet which includes *a flag indicating that the packet is an encapsulated packet* (New Claim 69).

Accordingly, applicant respectfully submits that Claims 2, 3, 7, 17, 18, 22, 31-33, 40-42, 60, 63, and 69 are patentable, and respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections and allowance of the claims.

Independent Claims 4, 19, and 49

The Office Action rejected Claims 4 and 19 under 35 U.S.C. § 103(a) as unpatentable over Aversa in view of Boucher. The Office Action also rejected Claim 49 as unpatentable under Section 103(a) as unpatentable over Aversa in view of Boucher and Snoeren. Applicant respectfully disagrees, but has amended these independent claims to further advance prosecution of the present application.

As amended, Claim 4 recites:

4. An information processing system, comprising:
a first computing device configured to:
 - receive a request packet originating from a client;
 - when the packet is associated with a connection that corresponds to an application of the first computing device, forward the packet and a reference to an associated connection endpoint to a network protocol stack of the first computing device that is external to an operating system of the first computing device; and
 - when the packet is associated with a connection that corresponds to an application of a second computing device distinct from the first computing device, selectively *encapsulate the packet and forward the encapsulated packet to the second computing device*, wherein the encapsulated packet includes a reference to a connection endpoint associated with the packet *and an indication that the encapsulated packet is a forwarded packet*. (Emphasis added.)

As amended, Claim 19 recites:

19. A method performed by a first computing device of an information processing system, the method comprising:
 - receiving a request packet originating from a client;
 - when the packet is associated with a connection that corresponds to an application of the first computing device, forwarding the packet and a reference to an associated connection endpoint to a network protocol stack of the first computing device that is external to an operating system of the first computing device; and
 - when the packet is associated with a connection that corresponds to an application of a second computing device distinct from the first computing device, selectively *encapsulating the packet and forwarding the encapsulated packet to the second computing device*, wherein the encapsulated packet includes a reference to a connection endpoint

associated with the packet *and an indication that the encapsulated packet is a forwarded packet.* (Emphasis added.)

As amended, Claim 49 recites:

49. A computer-readable memory medium containing instructions for controlling a processor of a first server to selectively load balance and direct network requests among a plurality of servers by:
receiving a request packet originating from a client;
selectively:

when the packet is associated with a connection endpoint bound to a socket of an application of the first server, forwarding the packet and a reference to the associated connection endpoint to a protocol stack of the first server that is external to an operating system of the first server; and

when the packet is associated with a connection endpoint bound to a socket of an application of a second server, *encapsulating the packet and forwarding the encapsulated packet to a second server*, the encapsulated packet including a reference to the associated connection endpoint bound to the socket of the application of the second server *and an indication that the encapsulated packet is a forwarded packet.* (Emphasis added.)

Applicant respectfully submits that Aversa, Boucher, and Snoeren, either alone or in combination, fail to teach or suggest *encapsulating a packet* and forwarding the encapsulated packet to a second server (or second computing device), the encapsulated packet including a reference to an associated connection endpoint *and an indication that the encapsulated packet is a forwarded packet*, as recited in Claims 4, 19, and 49.

Applicant respectfully submits that Aversa is the only patent or publication of record that discloses forwarding encapsulated packets. However, Aversa fails to disclose or suggest the features of Claims 4, 19, and 49, because Aversa discloses only the forwarding of packets using IP-IP encapsulation. The encapsulated packet recited in Claims 4, 19, and 49, which contains *an indication that the encapsulated packet is a forwarded packet*, is patentably distinct from the IP-IP encapsulation of Aversa, as it includes additional information in the packet that improves efficiency. (See Specification, para. 248.) Applicant further submits that none of the other cited patents or publications make up for this deficiency of Aversa.

Accordingly, applicant respectfully submits that Claims 4, 19, and 49 are patentable, and respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections and allowance of the claims.

Dependent Claims 5, 6, 20, 21, 34, 43, 50-52, 61, and 64

Claims 5, 6, 34, and 61 depend from Claim 4. Claims 20, 21, 43, and 64 depend from Claim 19. Claims 50-52 depend from Claim 49. Applicant respectfully submits that these claims are allowable at least by virtue of these dependencies, as well as by virtue of the additional claim features set forth therein.

Accordingly, applicant respectfully submits that Claims 5, 6, 20, 21, 34, 43, 50-52, 61, and 64 are patentable, and respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections and allowance of the claims.

Independent Claims 10, 25, and 53

The Office Action rejected independent Claims 10, 25, and 53 under 35 U.S.C. § 103(a) as unpatentable over Aversa in view of Snoeren. Applicant respectfully disagrees, but has amended these independent claims to further advance prosecution of the present application.

As amended, Claim 10 recites:

10. An information processing system, comprising:
a first computing device configured to:
associate an application of the first computing device with
a data structure associated with a connection to a client; and
selectively:
*disassociate the application of the first computing
device from the data structure; and
subsequently output an encapsulated packet
including a reference to the data structure to a second computing device
to associate an application of the second computing device with the data
structure, and to enable the second computing device to output packets to
the client configured to appear to the client to have been sent from the first
computing device.* (Emphasis added.)

As amended, Claim 25 recites:

25. A method performed by a first computing device of an information processing system, the method comprising:
associating an application of the first computing device with a data structure associated with a connection to a client; and
selectively:

disassociating the application of the first computing device from the data structure; and

subsequently outputting an encapsulated packet including a reference to the data structure to a second computing device to associate an application of the second computing device with the data structure, and to enable the second computing device to output packets to the client configured to appear to the client to have been sent from the first computing device. (Emphasis added.)

As amended, Claim 53 recites:

53. A computer-readable memory medium containing instructions for controlling a processor of a first server to selectively load balance and direct network requests among a plurality of servers by:

associating an application of the first server to a data structure associated with a connection with a client;

selectively disassociating the application of the first server from the data structure; and

subsequently outputting an encapsulated packet including a reference to the data structure to a second server for associating an application of the second server with the data structure, and to enable the second server to output packets to the client configured to appear to the client to have been sent from the first server. (Emphasis added.)

The Office Action rejected Claims 10, 25, and 53 for the same reasons as Claim 1. Accordingly, applicant respectfully submits that these claims are allowable for at least the reasons Claim 1 is allowable, as well as additional reasons.

For instance, applicant respectfully submits that the cited patents and publications fail to teach or suggest the combination of features recited in Claims 10, 25, and 53, associating an application of a first server (or first computing device) with a data structure associated with a connection with a client, *selectively disassociating* the application of the first server from the data structure, and subsequently outputting an encapsulated packet to a second server *for associating an application of the second server with the data structure, and to enable the second*

server to output packets to the client configured to appear to the client to have been sent from the first server.

Further, applicant respectfully submits that the Office Action failed to meet the burden to establish a *prima facie* conclusion of obviousness with respect to these claims. Specifically, the Office Action cited no evidence or reasoning showing the obviousness of "associating an application of the first computing device with a data structure associated with a connection with a client," or "disassociating the application of the first computing device from the data structure," as recited in Claims 10 and 25 (but not recited in Claim 1). The Office Action also cited no evidence or reasoning showing the obviousness of "associating an application of the first server to a data structure associated with a connection with a client," or "disassociating the application of the first server from the data structure," as recited in Claim 53 (but not recited in Claim 1).

An Office Action must meet the initial burden of factually supporting any *prima facie* conclusion of obviousness. The analysis supporting a rejection under Section 103 should be made explicit; rejections on obviousness cannot be sustained with mere conclusory statements. Instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *See* M.P.E.P. §§ 2142, 2143; *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 U.S.P.Q.2d 1385, 1396 (2007); *In re Kahn*, 441 F.3d 977, 988, 78 U.S.P.Q.2d 1329, 1336 (Fed. Cir. 2006). Accordingly, applicant respectfully submits that the Office Action failed to meet the burden for establishing a *prima facie* case of obviousness, and therefore submits that the 35 U.S.C. § 103(a) rejections of Claims 10, 25, and 53 were made in error.

Accordingly, applicant respectfully submits that Claims 10, 25, and 53 are allowable, and respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections and allowance of the claims.

Dependent Claims 11, 12, 26, 27, 38, 39, 47, 48, 54-57, 52, and 65

Claims 11, 12, 38, 39, and 62 depend from Claim 10. Claims 26, 27, 47, 48, and 65 depend from Claim 25. Claims 54-57 depend from Claim 53. Applicant respectfully submits that these claims are allowable at least by virtue of these dependencies, as well as by virtue of the additional claim features set forth therein.

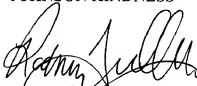
Accordingly, applicant respectfully submits that Claims 11, 12, 26, 27, 38, 39, 47, 48, 54-57, 52, and 65 are patentable, and respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections and allowance of the claims.

CONCLUSION

In view of the foregoing amendments and remarks, applicant submits that Claims 1-7, 10-12, 16-22, 25-27, 31-34, 38-43, 47-58, and 60-69 are in condition for allowance over the cited and applied patents and publications, and respectfully requests reconsideration and allowance of the same. The Examiner is invited to contact applicant's attorney at the number provided below to resolve any issues that may arise in order to advance prosecution of this application.

Respectfully submitted,

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